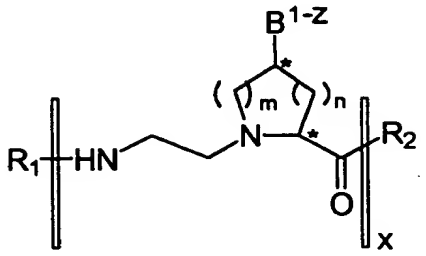
CLAIMS:

1. ~~A novel~~ Novel chiral, peptide nucleic acid oligomers having the formula :

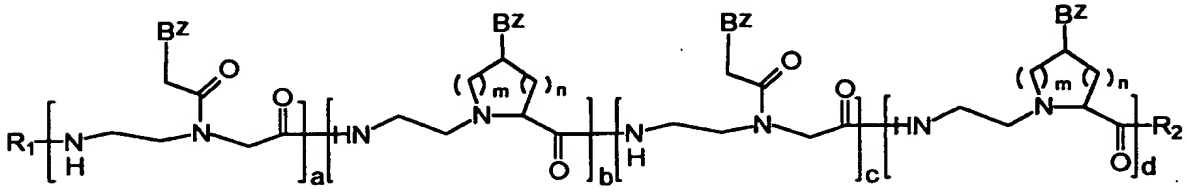


aep PNA II

~~W~~Wherein,

- m and n are 1 to 2 and x = 1-20;
- each of B^1-B^z is independently selected from the group consisting of H, HO, NH_2, naturally occurring nucleobases adenine (A), thymine (T), cytosine (C) and guanine (G), non-naturally occurring nucleobases, DNA intercalators, heterocyclic moieties and reporter ligands;
- each chiral monomeric unit independently selected from the four possible diastereomers; and
- R_1=H/Flurophore/Biotin; R_2=OH/$NH(CH_2)_2COOH$/ $NH(CH_2)_3NH(CH_2)_4NH(CH_2)_3NH_2$.

2. ~~A novel~~ Novel chiral, peptide nucleic acid oligomers having the formula :



aep PNA III

diastereomer

which are heteropolymeric aepPNA **III** ~~(with all four possible diastereomers)~~ involving one or more substitution of the non-chiral *aeg* unit of aminoethylglycyl PNA **I** in *aep*PNA **II** as below:

- each chiral monomer unit independently selected from the four possible diastereomers,
- a,b,c,d,m,n are integers with independent values in the range 1to10 and various combinations thereof,
- R_1 is H/$COCH_3$ or L (corresponding to a fluorophore *e.g.* dansyl, carboxyfluorescein),
- R_2 is OH, NH_2, $NHCH_2CH_2COOH$, sperminyl i.e., $NH(CH_2)_3NH(CH_2)_4$ $NH(CH_2)_3NH_2$, and
- each of B^1-B^z is independently selected from the group consisting of H, HO, NH_2, naturally occurring nucleobases, non-naturally occurring nucleobases, DNA intercalators, heterocyclic moieties and reporter ligands.

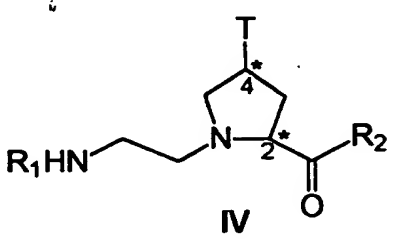
Novel

3. ~~A novel~~ chiral, peptide nucleic acid oligomers as claimed in claim 2, wherein m=n=1; B^z = T; R_1=H; R_2 = NH $(CH_2)_2COOH$, with
   i. a=7, b=1, c=d=0,
   ii. a=c=3, b=d=1,
   iii. a=b=c=d=1, repeating twice in that order,
   iv. a=b=c=0, d=8,
   v. a=d=0, b=1, c=7-11 and with various combinations of B^z.

Novel claim 1 or claim 2

4. ~~A novel chiral~~, peptide nucleic acid as claimed in ~~claim 1 and 2,~~ wherein the oligomers are synthesized by adaptation of standard peptide synthesis procedures, either in solution or in solid phase.

5. A monomer precursor-synthon having the formula IV



IV

Wherein,

- R_1 =H/Boc/Fmoc, R_2 = OMe/OH/OEt/Obenzyl,
- variation of chirality at positions 2 and 4 leading to four diastereomers (2*S*,4*R*), (2*R*,4*S*), (2*S*,4*S*) and (2*R*,4*R*), and
- T is the nucleo base.

6. A monomer precursor-synthon as claimed in claim 5, wherein T is a naturally occurring nucleobase.

7. A process for preparing compounds according to claim 5, comprising the steps of :
   A. providing the alkylating reagent (N-Boc)-2-aminoethylbromide **(2)** in two steps from 2-aminoethanol;
   B. providing N-alkylation of 4-hydroxyprolinemethylester with reagent prepared as in ~~claim 7A~~
      - alkylation of 4*R*-hydroxy-2*S*-prolinemethylester **(1a)** with (N-Boc)-2-aminoethyl bromide **(2)** to afford [1-(N-Boc)-2-aminoethyl]-4*R*-hydroxy-2*S*-prolinemethyl ester **(3)**,
      - alkylation of 4*R*-hydroxy-2*R*-prolinemethylester **(1b)** with (N-Boc)-2-aminoethyl bromide **(2)** to afford [1-(N-Boc)-2-aminoethyl]-4*R*-hydroxy-2*R*-prolinemethyl ester **(5)**,
      - alkylation of 4*S*-hydroxy-2*R*-prolinemethylester with (N-Boc)-2-aminoethyl bromide **(2)** to afford [1-(N-Boc)-2-aminoethyl]-4*S*-hydroxy-2*R*-proline methylester
      - alkylation of 4*S*-hydroxy-2*S*-prolinemethylester with (N-Boc)-2-aminoethyl bromide **(2)** to afford [1-(N-Boc)-2-aminoethyl]-4*S*-hydroxy-2*S*-proline methylester, and
   C. producing monomer synthons **(4a)** and **(6a)** by Mitsunobu reaction of compounds prepared according to ~~claim 7B~~ with N3-benzoylthymine.

8. A process for introducing novel chiral monomers as claimed in ~~claim 7C~~ 7 at specific/desired position(s) in the oligomers of desired sequences

9. A process for sequence specific recognition of a single or double stranded polynucleotide (DNA, RNA), by the oligomers as per ~~claims 1 and 2~~ Claim 1 or Claim 2 derived from the compounds according to claim 7.

10. A method of using peptide nucleic acid oligomers as claimed in claim 9 for diagnosing and/or modulating the expression of genes in organisms.

11. A method as claimed claim 10 wherein said modulation includes inhibiting transcription and replication of the said gene.

12. A process for treating disease conditions associated with undesired protein production in an organism by using the compound according to ~~claims 1 and 2~~ Claim 1 or Claim 2.

13. A pharmaceutical composition comprising a compound according to ~~claims 1 and 2~~ claim 1 or claim 2 along with any other pharmaceutically effective agents.